CLAIMS

1. A transmitter unit for use in a multi-carrier communication system, comprising:

one or more encoders, each encoder operative to receive and code a respective channel data stream to generate a corresponding coded data stream;

a symbol mapping element coupled to the one or more encoders and operative to receive and map data from one or more coded data streams to generate modulation symbol vectors, wherein each modulation symbol vector includes a plurality of data values used to modulate a plurality of tones to generate an OFDM symbol, wherein the data from each coded data stream is mapped to a respective set of one or more circuits, and wherein each circuit includes a particular set of one or more tones; and

a modulator coupled to the symbol mapping element and operative to receive and modulate the modulation symbol vectors to provide a modulated signal.

2. The transmitter unit of claim 1, further comprising:

one or more scaling elements coupled to the one or more encoders, each scaling element operative to receive and scale a respective coded data stream with a particular scaling factor to generate a corresponding scaled data stream that is then provided to the symbol mapping element.

3. The transmitter unit of claim 1, wherein the modulator includes

an inverse Fourier transform operative to receive the modulation symbol vectors and generate a time-domain representation of each modulation symbol vector to provide a corresponding OFDM symbol,

a cyclic prefix generator coupled to the inverse Fourier transform and operative to repeat a portion of each OFDM symbol to generate a corresponding transmission symbol, and

an upconverter coupled to the cyclic prefix generator and operative to modulate transmission symbols to generate the modulated signal.

4. The transmitter unit of claim 1, wherein data for each channel data stream is transmitted in packets.

5. The transmitter unit of claim 4, wherein each packet includes a packet type identifier indicative of a change in circuit to be used to transmit a next packet, and a circuit identifier indicative of a particular circuit to be used to transmit the next packet.

6. The transmitter unit of claim 4, wherein transmissions for the one or more channel data streams occur over slots, and wherein each slot includes a plurality of OFDM symbols.

7. The transmitter unit of claim 6, wherein a low rate transmission is achieved by transmitting a packet on a particular circuit every particular number of slots.

8. The transmitter unit of claim 6, wherein each slot is divided into two or more partitions, and wherein each partition includes one or more OFDM symbols and supports one or more types of service.

9. The transmitter unit of claim 8, wherein a first partition of each slot supports a first type of service having a first processing delays requirements and a second partition of each slot supports a second type of service having a second processing delays requirements.

10. The transmitter unit of claim 9, wherein the first type of service is full duplex real time services, and wherein the second type of service is half duplex real time services or non real time services, or both.

11. The transmitter unit of claim 6, wherein full rate data for a particular channel data stream is transmitted via a first circuit and lower rate data is transmitted via a second circuit.

12. The transmitter unit of claim 11, wherein the second circuit is transmitted once every particular number of slots.

13. The transmitter unit of claim 11, wherein the second circuit has a lower capacity than the first circuit.

14. The transmitter unit of claim 11, wherein an indication to use the second circuit is sent in a field of a packet transmitted on the first circuit.

15. The transmitter unit of claim 11, wherein an indication to use the first circuit is send on a control channel.

16. The transmitter unit of claim 11, wherein a new circuit is utilized after receiving an acknowledgment of receipt of an indication to use the new circuit.

17. The transmitter unit of claim 1, wherein each circuit includes a plurality of tones from a plurality of OFDM symbols.

18. The transmitter unit of claim 1, wherein each circuit includes a plurality of tones from a single OFDM symbol.

19. The transmitter unit of claim 1, wherein each circuit includes all tones from one or more OFDM symbols.

20. The transmitter unit of claim 1, wherein circuits used for transmitting data are defined with equal capacity.

21. The transmitter unit of claim 1, further comprising:

one or more cover elements coupled to the one or more encoders, each cover element operative to receive and cover a respective coded data stream with a particular Walsh sequence assigned to that coded data stream to generate a corresponding covered data stream.

22. The transmitter unit of claim 21, further comprising:

one or more scaling elements coupled to the one or more cover elements, each scaling element operative to receive and scale a respective covered data stream with a particular scaling factor to generate a corresponding scaled data stream.

23. The transmitter unit of claim 22, further comprising:

a summer coupled to the one or more scaling elements and operative to receive and sum one or more scaled data streams.

24. The transmitter unit of claim 21, wherein each Walsh sequence is transmitted over multiple tones of each of the OFDM symbols used for the Walsh sequence.

25. The transmitter unit of claim 21, wherein the length of the Walsh sequence is matched to the number of tones in each OFDM symbol.

26. The transmitter unit of claim 4, wherein each packet includes a user identifier indicative an intended recipient of the packet.

27. A transmitter unit for use in a multi-carrier communication system, comprising:

one or more encoders, each encoder operative to receive and code a respective channel data stream to generate a corresponding coded data stream;

a symbol mapping element coupled to the one or more encoders and operative to receive and map data from one or more coded data streams to generate modulation symbol vectors, wherein each modulation symbol vector includes a plurality of data values used to modulate a plurality of tones to generate an OFDM symbol, wherein the data from each coded data stream is mapped to a respective set of one or more circuits, and wherein each circuit includes a respective set of one or more tones;

an inverse Fourier transform coupled to the symbol mapping element and operative to receive the modulation symbol vectors and generate a time-domain representation of each modulation symbol vector to provide a corresponding OFDM symbol;

a cyclic prefix generator coupled to the inverse Fourier transform and operative to repeat a portion of each OFDM symbol to generate a corresponding transmission symbol; and

an upconverter coupled to the cyclic prefix generator and operative to modulate transmission symbols to generate the modulated signal, and

wherein transmissions for the one or more channel data streams occurs over slots, wherein each slot includes a plurality of OFDM symbols, and wherein full rate data for a particular channel data stream is transmitted via a first circuit and lower rate data is transmitted via a second circuit.

28. A method for generating and transmitting a modulated signal, comprising:

receiving one or more channel data streams;

coding each channel data stream with a particular coding scheme to generate a corresponding coded data stream;

mapping data from one or more coded data streams to generate modulation symbol vectors, wherein each modulation symbol vector includes a plurality of data values used to modulate a plurality of tones to generate an OFDM symbol, wherein the data from each coded data stream is mapped to a respective set of one or more circuits, and wherein each circuit includes a particular set of one or more tones; and

modulating the modulation symbol vectors to provide a modulated signal.

29. The method of claim 28, further comprising:

scaling each coded data stream with a particular scaling factor to generate the corresponding scaled data stream.

30. The method of claim 28, further comprising:

generating a time-domain representation of each modulation symbol vector to provide a corresponding OFDM symbol;

repeating a portion of each OFDM symbol to generate a corresponding transmission symbol; and

modulating transmission symbols to generate the modulated signal.

31. A receiver unit comprising:

an antenna operative to receive a modulated signal;

a front end processor coupled to the antenna and operative to process the received signal to generate samples;

a Fourier transform coupled to the front end processor and operative to receive samples from the front end processor and generate transformed representations of the samples;

a processor coupled to the Fourier transform and operative to process the transformed representations to generate at a symbol stream corresponding to a particular transmission being processed; and

a decoder coupled to the processor and operative to receive and decode the symbol stream to generate decoded data,

wherein the modulated signal is generated by coding one or more channel data streams with a particular coding scheme to generate one or more coded data streams, mapping data from the one or more coded data streams to generate modulation symbol vectors, and modulating the modulation symbol

vectors to provide a modulated signal, and wherein each modulation symbol vector includes a plurality of data values used to modulate a plurality of tones to generate an OFDM symbol, wherein the data from each coded data stream is mapped to a respective set of one or more circuits, and wherein each circuit includes a respective set of one or more tones.